

ABSTRACT

5 METHOD AND APPARATUS FOR A VARIABLE BANDWIDTH MULTI-PROTOCOL X-DSL TRANSCEIVER

An apparatus and method is disclosed for a variable bandwidth X-DSL modem. The modem implements a discrete multi-tone (DMT) line code with varying tone spacing depending on the bandwidth availability on selected subscriber lines. For short subscriber loops that qualify for high data rates the spacing between tones in a tone set is expanded to support the higher data rates. A DFT/IDFT engine is implemented in the DSP with a DFT portion to convert digitized tone sets on a receive path for each channel to digitized symbols and an IDFT portion to convert the digitized symbols on the transmit path to digitized tone sets. The DFT/IDFT engine provides variable tone spacing for the at least one channel. A variable rate interpolator couples to the IDFT portion of the DFT/IDFT engine and sets the sampling rate at the output of the IDFT to match the sampling rate of a digital input to the digital-to-analog (DAC) portion of the analog front end (AFE). A variable rate decimator provides corresponding capability on the receive path. A scheduler couples to the DFT/IDFT engine for scheduling channels to be processed by the DFT/IDFT engine during each processing interval. An initialization procedure is used to determine appropriate tone spacing to be used for the channel based on the loop qualifications of the channel.